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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Conboy et al. Examiner: Butler, M.  
Serial No.: 09/207,282 Group Art Unit: 3651  
Appeal No.: 2002-1821  
Filed: December 8, 1998 Docket No.: AMDA.379PA  
(TT2221)  
Title: MANAGEMENT OF MULTIPLE TYPES OF EMPTY CARRIERS IN  
AUTOMATED MATERIAL HANDLING SYSTEMS

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this paper is being deposited in the United States Postal Service, as first class mail, in an envelope addressed to: Assistant Commissioner for Patents, BOX DAC, Washington, D.C. 20231, on March 19, 2003.  
By: Kelly S. Wallygney

PETITION TO WITHDRAW HOLDING  
OF ABANDONMENT UNDER 37 C.F.R. §1.181

Assistant Commissioner of Patents  
BOX DAC - Technology Group 3653  
Washington, DC 20231

This Petition is responsive to the Notice of Abandonment, mailed on February 24, 2003, for this patent application under Appeal No. 2002-1821, and assigned Application Serial Number 09/207,282. Though believed unnecessary due to the evidence, as presented below and attached, **authorization is given to charge Deposit Account 01-0365 (TT2221) any required fee to enter this Petition**. All fees include requisite fees to enter the Appeal Brief with Petition for one-month Extension of Time as were timely filed on August 31, 2001.

Applicant hereby petitions to withdraw holding of abandonment of this patent application under Appeal, and furthermore submits that the Statutory Fee as required under 37 C.F.R. § 1.17(c) was in fact timely-submitted and presented within the Appeal Brief filed on August 31, 2001, co-filed with Petition for one-month Extension of Time.

The facts are as follows:

1. The Statutory Fee for filing a Brief in support of Appeal, as required under 37 C.F.R. 1.17(c), was presented on page 10 of the Appeal Brief filed August 31, 2001. This request to charge Deposit Account 01-0365 in the amount of \$310.00 (FY 2001) was clearly authorized on this page, directly above the signatory block of the agent for the Appellant. Attached please find a duplicate of the Appeal Brief 8/31/01 with page 10 flagged.

2. This Appeal Brief was filed with a Petition for one-month Extension of Time. This Petition also clearly authorized the requisite Petition fee under §1.136(a) to the same Deposit Account. Attached please find duplicate copy of the Petition for Extension of Time accompanying Brief 8/31/01.

3. Appellant, Advanced Micro Devices, Inc. as Deposit Account holder, maintained sufficient funds to effect said payment of all requisite fees for the Appeal Brief filing in August 2001. This Account recorded a Debit for the prior Notice of Appeal with One-month Extension of Time in July 2001. Said Account, however did not receive the requested debit for the Appeal Brief with Petition for Extension of Time. A printout of the balance as of July 2001 and the aforementioned activity on this Account is attached (with redaction of non-application-related data).

4. The Board of Patent Appeals formally acknowledged on July 1, 2002 that the following documents were filed by Appellant: Appeal Brief, docketed 9/6/2001 and Reply Brief, docketed 3/12/2002 (Docketing Report attached).

5. No Notice was ever forwarded to the Appellant by the Board of Patent Appeals that the Appeal Brief filing was incomplete; hence all pages, in triplicate, to include the requisite signatory block of the agent on page 10 of the Appeal Brief were by fact present.

6. The Notice of Abandonment, moreover, does not repudiate the completeness of the Appeal Brief filing, dismisses the Appeal only under line 3(a) regarding the alleged non-submission of a statutory filing fee.

7. Considerable time has elapsed from the filing of the Appeal Brief dated August 31, 2001 until this Notice of Abandonment dated February 24, 2003. During said time, Appellant has received and filed official correspondences through September 30, 2002.

In conclusion, Appellant requests that the Holding of Abandonment be withdrawn for this Patent Application under Appeal, and this application be returned to and reinstated with the Board of Patent and Appeal and Interferences.

Thank you for your careful consideration of this matter. Please contact the undersigned attorney directly with any questions regarding this Petition.

Respectfully submitted,

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By: 

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Conboy et al. Examiner: Butler, M.  
Serial No.: 09/207,282 Group Art Unit: 3651  
Filed: December 8, 1998 Docket No.: New: AMDA.379PA  
Old: 1179.184US01  
Title: MANAGEMENT OF MULTIPLE TYPES OF EMPTY CARRIERS IN  
AUTOMATED MATERIAL HANDLING SYSTEMS

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this paper is being deposited in the United States Postal Service in triplicate, as first class mail, in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on August 31, 2001.

By:

Kelly S. Wattigney

**APPEAL BRIEF**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

This is an Appeal Brief submitted pursuant to 37 CFR section 1.192 for the above-referenced patent application and is being filed in triplicate.

**I. Real Party in Interest**

The real party in interest is Advanced Micro Devices, Inc. (AMD), of Sunnyvale, CA. The above-referenced patent application is assigned to AMD.

**II. Related Appeals and Interferences**

There are no related appeals or interferences.

**III. Status of Claims**

Claims 1-20 are being formally appealed. The appealed claims in their currently amended form may be found in the attached appendix.

#### **IV. Status of Amendments**

A first Office Action was mailed on October 4, 2000 rejecting all of the pending claims and rejecting claims 1-9 based on double patenting in view of U.S. Patent No. 5,838,566, which is assigned to the Assignee of the present application. At that time, the Examiner also suggested filing a terminal disclaimer in compliance with 37 C.F.R. 1.321(c) to overcome the double patenting rejection. In reply to the First Office Action, an Amendment was filed on January 3, 2001, which included new claims 19 and 20. On February 28, 2001 a Final Office Action was mailed rejecting all of the pending claims. At this time, the Examiner commented that Appellants had not overcome the prior art with a seasonably filed 1.131 Affidavit but that Appellants may be able to overcome the prior art by taking advantage of the AIPA amendments to §103(c).

An After Final Office Action Response was filed on April 24, 2001 including a Terminal Disclaimer under 37 C.F.R. §1.321 in combination with a Declaration under 37 C.F.R. §1.130. The Terminal Disclaimer under Rule 1.321 and the Declaration under Rule 1.130 were submitted to remove the '566 reference as the primary reference and to overcome each of the pending rejections. An Advisory Action was mailed on May 18, 2001 wherein the Examiner acknowledged that the Terminal Disclaimer was entered and is now part of the record. The Examiner remarks indicated that he interpreted Appellants' filing of the Terminal Disclaimer/Rule 1.130 Declaration as an attempt to overcome the cited references by following the procedure outlined in the AIPA amendments to §103(c). Appellants filed a Supplemental After Final Office Action Response on May 31, 2001 clarifying the purpose and effect of filing the Terminal Disclaimer/Rule 1.130 Declaration. A second Advisory Action was mailed on June 19, 2001 indicating that the subsequent response would not be considered. A Notice of Appeal was filed along with a Petition for Extension of Time on June 28, 2001.

#### **V. Summary of Invention**

Appellants' invention is directed to an automated material handling system that includes a plurality of material carriers including a plurality of empty carriers classified into at least two empty carrier types. The system includes at least one stock area, with each stock area including a plurality of bins for storing material carriers, wherein each stock area is

associated with at least one threshold for each empty carrier type. A control system is coupled to a first one of the stock areas for computing an empty percentage for the first stock area for each empty carrier type, the empty percentage for a particular carrier type being the percentage of bins of the first one stock area which contain empty carriers of the particular type. A transportation system is included that is responsive to the control system for selectively moving an empty carrier of a certain empty carrier type between a staging area and the first stock area based on a comparison of the empty percentage for the certain carrier type to the at least one threshold of the first stock area for the certain empty carrier type.

In a related embodiment, each empty carrier type is associated with a priority and the empty carriers are moved by the transportation system based on the priority of the certain type and the priority of the other carrier types.

In another related embodiment, the control system of the material handling system calculates an empty move rate for the certain carrier types as the number of empty carriers of the certain type moved by the transportation system in a predetermined time period and moves the empty carriers of the certain type if the empty move rate is less than a predetermined value.

In yet another related embodiment, the control system calculates a global empty move rate as the number of all empty carriers moved by the transportation system in a predetermined time period if the global empty move rate is less than a predetermined value.

## **VI. Issues for Review**

The claims 1-20 on appeal stand rejected under §103(a) as being unpatentable over *Conboy et al.* (U.S. Pat. No. 5,838,566). Claims 19 and 20 stand rejected under §103(a) as being unpatentable over *Conboy et al.* in view of *Burney* (U.S. Pat. No. 4,829,445). Claims 19 and 20 also stand rejected under §103(a) as being unpatentable over *Conboy et al.* in view of *Tau* (U.S. Pat. No. 5,751,581).

The issues are as follows:

1. Are the obviousness rejections proper when the primary reference, the *Conboy et al.* '566 patent, has been removed as a prior art reference in view of 37 C.F.R. §1.321 and the 37 C.F.R. §1.130 Declaration?
2. Should the obviousness rejections be upheld without evidence of motivation for modifying *Conboy et al.* as the asserted reference?

3. Should the obviousness rejections be upheld where the asserted reference of *Conboy et al* individually, or in combination with either *Burney* or *Tau*, fails to correspond to the claimed invention?

## **VII. Grouping of Claims**

The claims as now presented do not stand and fall together and are separately patentable for the reasons discussed in the Argument. For purposes of this appeal, the claims should be grouped as follows: Group I - claims 1-6, 10-15 and 19-20; and Group II – claims 7 and 16; Group III - claims 8 and 17; and Group IV – claims 9 and 18.

## **VIII. Argument**

Appellants submit that the claims of Groups I – IV are patentably distinguishable from each other and from the cited prior art references. The claims of Group II are directed to associating each empty carrier type with a priority and moving the empty carriers based on the priority of the certain carrier type and the priorities of the other carrier types; these limitations are not necessarily present in the claims of Groups I and III-IV, nor are these aspects of the invention taught or disclosed in any of the asserted prior art references.

The claims of Group III are directed to calculating an empty move rate for a certain carrier type moved in a predetermined time period wherein the empty carriers are only moved when the empty move rate is less than a predetermined value; these limitations are not necessarily present in the claims of Groups I-II and IV, nor is this aspect of the invention taught or disclosed in any of the asserted prior art references.

The claims of Group IV are directed to calculating a global empty move rate as the number of all empty carriers moved in the system in a predetermined time period, wherein empty carriers of a certain type are moved if the global empty move rate is less than a predetermined value; these limitations are not necessarily present in the claims of Group I-III, nor are these aspects of the invention taught or disclosed in the asserted prior art references.

**1. The obviousness rejections are not proper when the primary reference, the *Conboy et al* '566 patent, has been removed as a prior art reference in view of 37 C.F.R. §1.321 and the 37 C.F.R. §1.130 Declaration.**

In the Final Office Action, the Examiner rejects the claims of Groups I-IV under §103(a) as being obvious in view of *Conboy et. al* (Paper 7, page 2). However, the Examiner failed to remove the *Conboy* reference after the Appellants submitted a Declaration under 37 C.F.R. §1.130 with a Terminal Disclaimer under 37 C.F.R. §1.321 in the After Final Response dated April 24, 2001. The Examiner acknowledged in the Advisory Action that the terminal disclaimer was entered and is now part of the record (Paper 11). Section 1.130(a) states, in pertinent part:

When any claim of an application or a patent under reexamination is rejected under 35 U.S.C. 103 in view of a U.S. patent which is not prior art under 35 U.S.C 102(b), and the inventions defined by the claims in the application or patent under reexamination and by the claims in the patent are not identical but are not patentably distinct, and the inventions are owned by the same party, the applicant or owner of the patent under reexamination may disqualify the patent as prior art. The patent can be disqualified as prior art by submission of: (1) a terminal disclaimer in accordance with §1.321(c), and (2) an oath or declaration stating that the application or patent under reexamination and the patent are currently owned by the same party, and that the inventor named in the application or patent under reexamination is the prior inventor under 35 U.S.C. 104.

37 C.F.R. §1.130(a). It is clear from the record, as acknowledged by the Examiner in the Advisory Action (Paper 11), that the Appellants filed a Rule 1.130 Declaration and Terminal Disclaimer under 37 C.F.R. §1.321. According to the law and Rule 1.130, the properly-filed Declaration and Terminal Disclaimer disqualify the *Conboy* patent as prior art.

Appellants acknowledge that a §1.131 Declaration was being considered to overcome the *Conboy* patent. However, after reviewing MPEP §718, it becomes clear that §1.130 provided the correct course of action and that §1.131 could not be used. MPEP §718 clearly states that “an applicant or an owner of a patent under reexamination, in this situation, is prevented from using 37 C.F.R. 1.131 to antedate a commonly owned U.S. patent due to the requirement in 37 C.F.R. 1.131 that any U.S. patent to be antedated not claim the same patentable invention as the application or patent under reexamination.”(emphasis added).

In a telephone conversation on May 31, 2001, Applicants' agent (Mr. Robert J. Crawford) and Examiner Butler reviewed this issue and repeatedly reviewed the text of MPEP §718; both acknowledged that the language of MPEP §718 was confusing and surprising.

In this regard, Appellants take issue with the Examiner's characterization of Appellants' Supplemental Response filed on May 31, 2001 as being "diversionary sandbagging" (Paper 14). Moreover, had Appellants been previously aware of MPEP §718, a §1.131 Declaration would never have been considered.

The issue is not whether a §1.131 Declaration could have been used but rather whether the §1.130 Declaration is the proper document for disqualifying a commonly owned patent. Since the Appellants have properly filed a Rule 1.130 Declaration and Terminal Disclaimer under 37 C.F.R. §1.321, the law clearly states that the Declaration operates to disqualify the *Conboy* patent as prior art. In view of the foregoing, the *Conboy* patent must be disqualified as prior art and must be removed from further consideration.

Accordingly, all of the pending 103 rejections must be removed because the primary reference is no longer available as prior art against the present application.

**2. The obviousness rejections should not be upheld without evidence of motivation for the modifying *Conboy et al* as the asserted reference.**

The §103 rejection of the claims of Groups I-IV (*e.g.*, independent claims 1, 10, 19 and 20) cannot be upheld because the Examiner failed to provide evidence of motivation to modify the asserted reference. In rejecting the claims of Groups I-IV, the Examiner concludes that it would have obvious for one skilled in the art to classify the carriers into a plurality of types because knowing the attributes and features of the carriers assists in determining which carriers to move (Final Office Action, Paper 7, page 6). The issue before the Board is whether the motivation stated in the Final Office Action is evidenced by the cited prior art.

The motivation stated by the Examiner is not found in the cited prior art and certainly not in *Conboy*. *Conboy* teaches an improved method of managing empty carriers in order to reduce cost by reducing the number of empty carriers needed in a fabrication facility and reducing the number/size of stocking areas in the fabrication facility (col. 2, lines 1-6). These teachings of *Conboy* do not support the Examiner's stated motivation, which must come from the asserted references. See *In re Dembiczak*, 175 F.3d 994, 50 U.S.P.Q.2d 1614 (Fed. Cir. 1999) ("The range of sources available, however, does not diminish the requirement for actual evidence. That is, the showing must be clear and particular.").

Further, one skilled in the art would conclude that modifying *Conboy* to incorporate “attributes and features of the carriers” would be an extraneous modification that provides no perceived benefit. *Conboy* is trying to primarily manage the large quantity of empty carriers that are used in the fabrication process and is not concerned with the “attributes and features” of the same type of empty carriers (col. 1, line 64-col. 2, line 6). Because no evidence or additional rationale was provided to support the asserted combination, the proposed modification is improper.

Accordingly, the §103 rejection of the claimed invention of Groups I-IV based on *Conboy* is improper and must be withdrawn.

**3. The obviousness rejections should not be upheld when the asserted reference of *Conboy et al* individually, or in combination with either *Burney* or *Tau*, fails to correspond to the claimed invention.**

*Conboy* individually, or in combination with either *Burney* or *Tau*, fails to teach all aspects of the claimed invention of Groups I-IV. The claims of Groups II-IV depend from the independent claims of Group I, which are directed to an automated material handling system that includes a plurality of empty carriers classified into at least two empty carrier types and a control system that computes an empty percentage calculation for a particular empty carrier type (e.g., Group I, claim 1, lines 2-3 and 7-9). The Examiner acknowledged in the Final Office Action that *Conboy* does not disclose classifying the empty carriers into a plurality of carrier types (Paper 7, page 6). As discussed in Issue 2, the Examiner also failed to provide evidence of motivation for modifying *Conboy* to classify the material carriers into at least two empty carrier types, as in Appellants’ claimed invention. In addition, the cited portions of *Conboy*, including the citation in column 12, lines 67 *et seq.*, is limited to a teaching concerning only empty carriers and not to classifying the empty carriers. In view of the foregoing, it is clear that *Conboy* fails to render obvious the claimed invention of Group I because not all aspects of Appellants’ claimed invention is taught or suggested in *Conboy*. Because the claims of Groups II-IV depend on the patentably distinct claims of Group I, the claims of Groups II-IV are also patentably distinguishable from the *Conboy*.

With respect to claims 19 and 20 of Group I, the Examiner cites *Burney* and *Tau* to allegedly provide the lacking teaching in *Conboy* of classifying the empty carriers into a

plurality of carrier types (Paper 7, page 6). The cited portions of *Burney* do not teach “empty carriers that are classified into a plurality of carrier types” as alleged by the Examiner (Paper 7, page 6-7). Instead, *Burney* only discloses that a list of active carriers, and not empties, is maintained (col. 33, lines 8-28); that the carriers are marked with bar codes to associate carriers with a particular task (col. 12, lines 18-26); that a description of the status of carriers is given (col. 2, lines 7-21) and that all carriers are identified by bar code and cannot be moved unless they are first accounted for (col. 21, lines 1-18). All of these teachings of *Burney* fail to correspond to classifying the empty carriers into at least two empty carrier types as in Appellants’ claimed invention.

Similarly, the cited portion of *Tau* does not teach “empty carriers that are classified into a plurality of carrier types” as alleged by the Examiner (Paper 7, page 7). Instead, *Tau* only discloses information about the lot, such as the lot identification number associated with a carrier identification and historical lot movement data (col. 34, lines 1-19). The teachings of *Tau* fail to correspond to classifying the empty carriers into at least two empty carrier types as in Appellants’ claimed invention.

With respect to Group II, *Conboy* also fails to teach all aspects of the claimed invention including the limitations directed to associating each empty carrier type with a priority and moving the empty carriers based on priority of the certain carrier type and the priorities of the other carrier types (*e.g.*, claim 7, lines 1-4). The cited portion of *Conboy* only teaches that the material is drawn from a second subset of carriers only if the system move rate is less than a predetermined value (col. 13, lines 40-44). This teaching does not correspond to Appellants’ claimed invention of associating each carrier type with a priority and moving the carriers based on the priority of other carrier types.

With respect to Group III, *Conboy* also fails to teach all aspects of the claimed invention including the limitations directed to calculating an empty move rate for a certain carrier type moved in a predetermined time period wherein the empty carriers are only moved when the empty move rate is less than a predetermined value (*e.g.*, claim 8, lines 2-6). The cited portion of *Conboy* only teaches that the predetermined threshold of the first empty percentage is maintained for each of said first and second stock areas (col. 13, lines 29-31). The teaching of maintaining the empty percentage of *Conboy* fails to correspond to calculating an empty move rate for a certain carrier type as in Appellants’ claimed invention.

With respect to Group IV, *Conboy* also fails to teach all aspects of the claimed invention including the limitation directed to calculating a global empty move rate as the number of all empty carriers moved in the system in a predetermined time period, wherein empty carriers of a certain type are moved if the global empty move rate is less than a predetermined value (*e.g.*, claim 9, lines 2-5). In the Final Office Action, the Examiner cites *Burney* and *Tau* to allegedly provide the lacking teaching in *Conboy* of the global carrier parameters (Paper 7, page 6). Global carrier parameters do not correspond to global move rates as in Appellants' claimed invention. In addition, the cited portion of *Burney* does not teach use of global empty move rates but instead teaches the use of a parameter-passing record that must be declared globally to pass data from one controller module to another (col. 46, lines 38-54). The teachings of *Burney* of parameter-passing records fail to correspond to calculating a global empty move rate as the number of all empty carriers are moved as in Appellants' claimed invention.

Similarly, the cited portions of *Tau* do not teach global empty move rates as in Appellants' claimed invention. Instead, *Tau* teaches extracting the number of empties and determining the destination stocker (col. 28, line 12-col. 29, line 64); performing parameter validation (col. 35, lines 1-8) and initializing a global variable array that contains a set of association of message names and corresponding functions (col. 9, lines 45-64). The teachings of *Tau* of extracting the number of empties, performing parameter validation, and initializing a global variable array fail to correspond to calculating a global empty move rate as the number of all empty carriers are moved as in Appellants' claimed invention.

In view of the foregoing, the Examiner failed to present a *prima facie* case of obviousness because *Conboy* individually, or in combination with either *Burney* or *Tau*, fails to teach or suggest all aspects of the claimed invention.

Accordingly, the §103 rejections of the claimed invention of Groups II-IV are improper and must be withdrawn.

#### **IX. Conclusion**

In view of the above distinctions, Appellants believe the claimed invention to be patentable over the cited references since none of the references cited render obvious Appellants' claimed invention. Claims 1-20 remain for consideration. Appellants

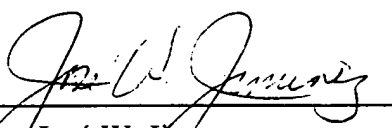
respectfully request reversal of the rejection as applied to the appealed claims and allowance of the entire application.

Please charge Deposit Account No. 01-0365 (TT2221) in the amount of \$310.00 for filing a Brief in support of an appeal as set forth in §1.17 (c).

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August 31, 2001

Respectfully submitted,

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## **APPENDIX OF APPEALED CLAIMS (09/207,282)**

1. An automated material handling system, comprising:
  - a plurality of material carriers including a plurality of empty carriers classified into at least two empty carrier types;
  - at least one stock area, each including a plurality of bins for storing material carriers, wherein each stock area is associated with at least one threshold for each empty carrier type;
  - a control system coupled to a first one of the stock areas for computing an empty percentage for the first stock area for each empty carrier type, the empty percentage for a particular carrier type being the percentage of bins of the first one stock area which contain empty carriers of the particular type; and
  - a transportation system responsive to the control system for selectively moving an empty carrier of a certain empty carrier type between a staging area and the first stock area based on a comparison of the empty percentage for the certain carrier type to the at least one threshold of the first stock area for the certain empty carrier type.
2. The automated material handling system as recited in claim 1, wherein the material carriers include semiconductor wafer carriers.
3. The automated material handling system as recited in claim 1, wherein the at least one threshold for the empty carrier of the certain carrier type includes a maximum value and wherein the transportation system moves an empty carrier of the certain carrier type from the first stock area to the staging area if the maximum value is exceeded by the empty percentage of the certain carrier type.
4. The automated material handling system as recited in claim 1, wherein the at least one threshold for the empty carrier of the certain carrier type includes a minimum value and wherein the transportation system moves an empty carrier of the certain carrier type to the first stock area from the staging area if the empty percentage of the certain carrier type falls below the minimum value.

5. The automated material handling system as recited in claim 1, wherein the staging area includes a second one of the stock areas.

6. The automated material handling system as recited in claim 1, wherein the control system calculates a system move rate as the number of the plurality of material carriers moved by said transportation system in a predetermined time period and the transportation system moves the empty carrier of the certain carrier type between the staging area and the first stock area only if the system move rate is less than a predetermined value.

7. The automated material handling system as recited in claim 1, wherein each empty carrier type is associated with a priority and wherein the transportation system moves the empty carrier of the certain carrier type between the first stock areas and the staging area based on the priority of the certain carrier type and the priorities of other carrier types.

8. The automated material handling system as recited in claim 1, wherein the control system calculates an empty move rate for the certain carrier type as the number of empty carriers of the certain carrier type moved by the transportation system in a predetermined time period and the transportation system moves the empty carrier of the certain carrier type between the staging area and the first stock area only if the empty move rate for the certain carrier type is less than a predetermined value.

9. The automated material handling system as recited in claim 1, wherein the control system calculates a global empty move rate as the number of all empty carriers moved by the transportation system in a predetermined time period, and the transportation system moves the empty carrier of the certain carrier type between the staging area and the first stock area only if the global empty move rate is less than a predetermined value.

10. A method for managing empty material carriers in an automated material handling system including a plurality of material carriers including empty material carriers and at least one stock area each including bins for storing material carriers, the method comprising:

classifying at least the empty material carriers into at least two empty carrier types;  
associating each of the stock areas with at least one threshold for each carrier type;  
computing an empty percentage for each empty carrier type for a first one of the stock areas, the empty percentage for a particular empty carrier type being the percentage of bins of the first one stock area which contain empty carriers of the particular type; and  
selectively moving an empty carrier of a certain empty carrier type between a staging area and the first stock area based on a comparison of the empty percentage for the certain carrier type for the first stock area to the at least one threshold of the first stock area for the certain carrier type.

11. The method of claim 10, wherein the material carriers include semiconductor wafer carriers.

12. The method of claim 10, wherein the at least one threshold for the empty carrier of the certain carrier type includes a maximum value and wherein selectively moving the empty carrier of the certain carrier type from the first stock area to the staging area includes moving the empty carrier of the certain carrier type if the maximum value is exceeded by the empty percentage of the certain carrier type.

13. The method of claim 10, wherein the at least one threshold for the empty carrier of the certain carrier type includes a minimum value and wherein selectively moving the empty carrier of the certain carrier type to the first stock area from the staging area includes moving the empty carrier of the certain carrier type if the empty percentage of the certain carrier type falls below the minimum value.

14. The method of claim 10, wherein the staging area includes a second one of the stock areas.

15. The method of claim 10, further including calculating a system move rate as the number of the plurality of material carriers moved in the system in a predetermined time period, wherein selectively moving the empty carrier of the certain carrier type between the

staging area and the first stock area includes moving the empty carrier of the certain carrier type only if the system move rate is less than a predetermined value.

16. The method of claim 10, further including associating each empty carrier type with a priority, wherein selectively moving the empty carrier of the certain carrier type between the first stock areas and the staging area includes moving the empty carrier of the certain carrier type based on the priority of the certain carrier type and the priorities of other carrier types.

17. The method of claim 10, further including calculating an empty move rate for the certain carrier type as the number of empty carriers of the certain carrier type moved in the system in a predetermined time period, wherein selectively moving the empty carrier of the certain carrier type between the staging area and the first stock area including moving the empty carrier of the certain carrier type only if the empty move rate for the certain carrier type is less than a predetermined value.

18. The method of claim 10, further including calculating a global empty move rate as the number of all empty carriers moved in the system in a predetermined time period, wherein selectively moving the empty carrier of the certain carrier type between the staging area and the first stock area includes moving the empty carrier of the certain carrier type only if the global empty move rate is less than a predetermined value.

19. An automated material handling system, comprising:

- a plurality of wafer carriers including a plurality of empty carriers classified into at least two empty carrier types;

- at least one stock area each including a plurality of bins for storing wafer carriers, wherein each stock area is associated with a predetermined quantity for each empty carrier type;

- a control system coupled to a first one of the stock areas for computing an empty percentage for the first stock area for each carrier type, the empty percentage for a particular

carrier type being the percentage of bins of the first one stock area which contain empty carriers of the particular type; and

a transportation system responsive to the control system for selectively moving an empty carrier of a certain empty carrier type between a staging area and the first stock area based on a comparison of the empty percentage for the certain carrier type to the predetermined quantity of the first stock area for the certain carrier type.

20. A system for managing empty material carriers in an automated material handling system, the material handling system including a plurality of material carriers that include a plurality of empty material carriers and at least one stock area each including bins for storing material carriers, the system comprising:

means for classifying the empty material carriers into at least two empty carrier types;

means for associating each of the stock areas with at least one threshold for each empty carrier type;

means for computing an empty percentage for each empty carrier type for a first one of the stock areas, the empty percentage for a particular empty carrier type being the percentage of bins of the first one stock area which contain empty carriers of the particular type; and

means for selectively moving an empty carrier of a certain empty carrier type between a staging area and the first stock area based on a comparison of the empty percentage for the certain carrier type for the first stock area to the at least one threshold of the first stock area for the certain empty carrier type.